MONTECH®

Operating Instructions

Handling Components
Grippers
GWU / GWUI

BA-100009

ENGLISH

Edition: 10/2005

Change index

Previous editions:

Edition	Note	Reference number
10/2005	First edition	BA-100009

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1 Important information

EC declaration of conformity (as per MRL appendix II A)

1.1 Manufacturer's declaration

Regulations and standards complied with:

- **Machinery directives 89/392/EC, 91/368/EEC**

Manufacturer
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CH-4552 Derendingen info@montech.ch

Product description and intended use

Grippers of types GWU and GWUI can be used in all applications where workpieces have to be regularly gripped externally for the purpose of transport (handling). The load limits set out in the section "Technical data" must be complied with under all circumstances.

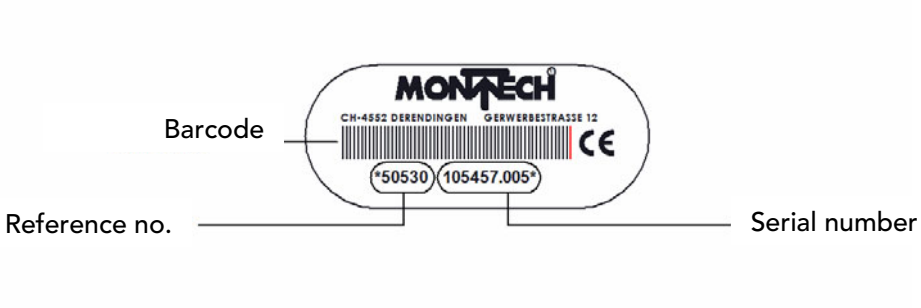
Hazards

The use of grippers of types GWU and GWUI in installations is only permissible when they are secured by MOVABLE, SEPARATING PROTECTIVE DEVICES as per EN 292-2 section 4.2.2.3. Failure to comply with this instruction can result in injury, e.g. squeezing of the fingers.

Additional information

The present instructions should enable the grippers GWU / GWUI to be used safely and correctly. If information required for your particular application is lacking, please consult the manufacturer. **Additional operating instructions can be obtained from our homepage www.montech.ch.**

Fig. 1.1-1: Nameplate



Montech AG
Management

i.V.

U. D. Wagner / C. Wullschleger

1.2 Validity of the User Manual

Our products are continually updated to reflect the latest state of the art and practical experience.

In line with product developments, our User Manuals are continually updated.

Every User Manual has an article number e.g. BA-100009.
The article number and the date of edition are evident on the title page.

Technical data for grippers GWU-16 / GWUI-16

		GWU-16 / GWUI-16
Opening angle (infinitely adjustable)	[°]	0-180°
Piston diameter	[mm]	16
Unit weight GWU/GWUI	[kg]	0.27
Moment of inertia Jz (closed)	[kgcm2]	0.56
Max. cycles per minute		max. 80 double strokes / minute
Operating pressure	[bar]	3-6
Operating medium		air filtered to 5µm, oiled or unoiled, dew point <6°C
Repetition accuracy at 5bar 1)	[mm]	±0.05
Check on end positions open/closed 2)		by inductive proximity switches
Pneumatic connection adjustable exhaust throttles with plug connection		hose-∅ 4 mm
Ambient: temperature	[°C]	10-50
rel. humidity		< 95% (non condensing)
purity of the air		normal workshop atmosphere
Warranty		2 years, commencing at the date of delivery
Maintenance		after 10 million cycles
Mounting position		as required
Materials		aluminium, steel, bronze

1) At Lz=33[mm] -> jaw end
   Difference between gripped end positions of 100 successive strokes under unchanged conditions

2) See special accessories chapter 1.8

Diagrams GWU-16 / GWUI-16

Fig. 1.2-1: Diagram: Weight of the individual finger

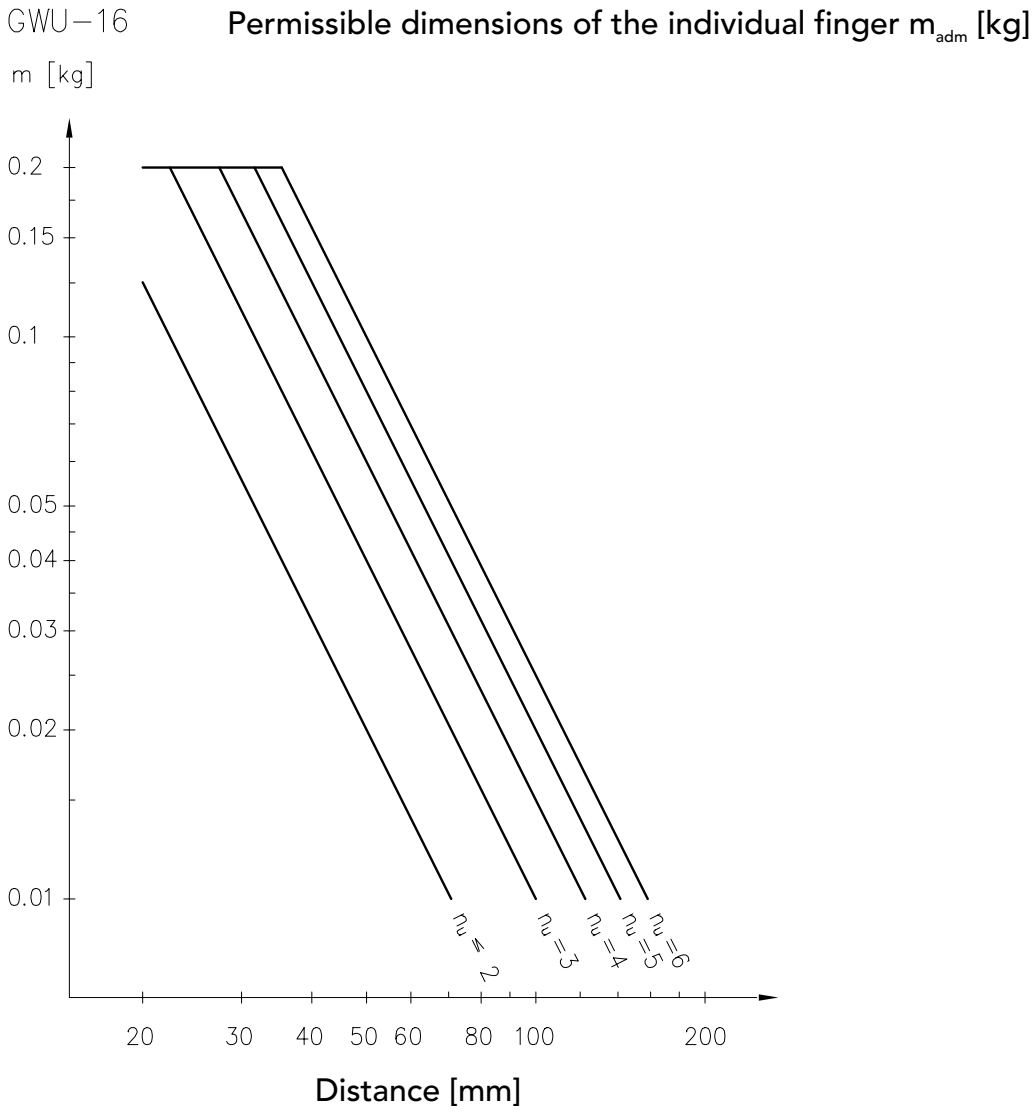


Fig. 1.2-2: Gripping force diagram

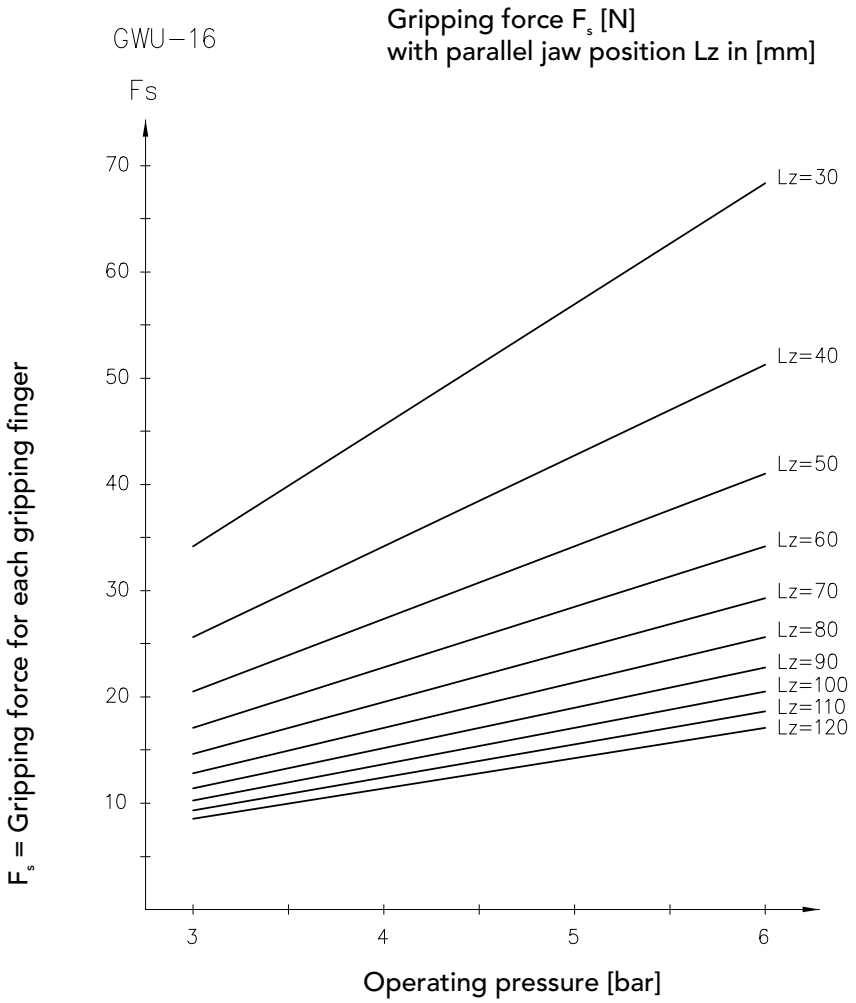
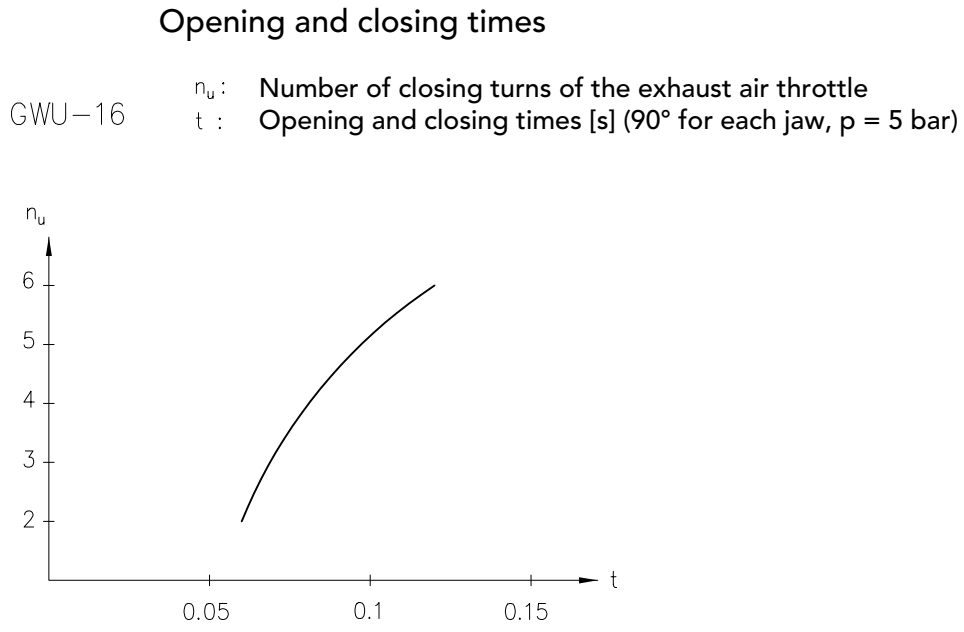
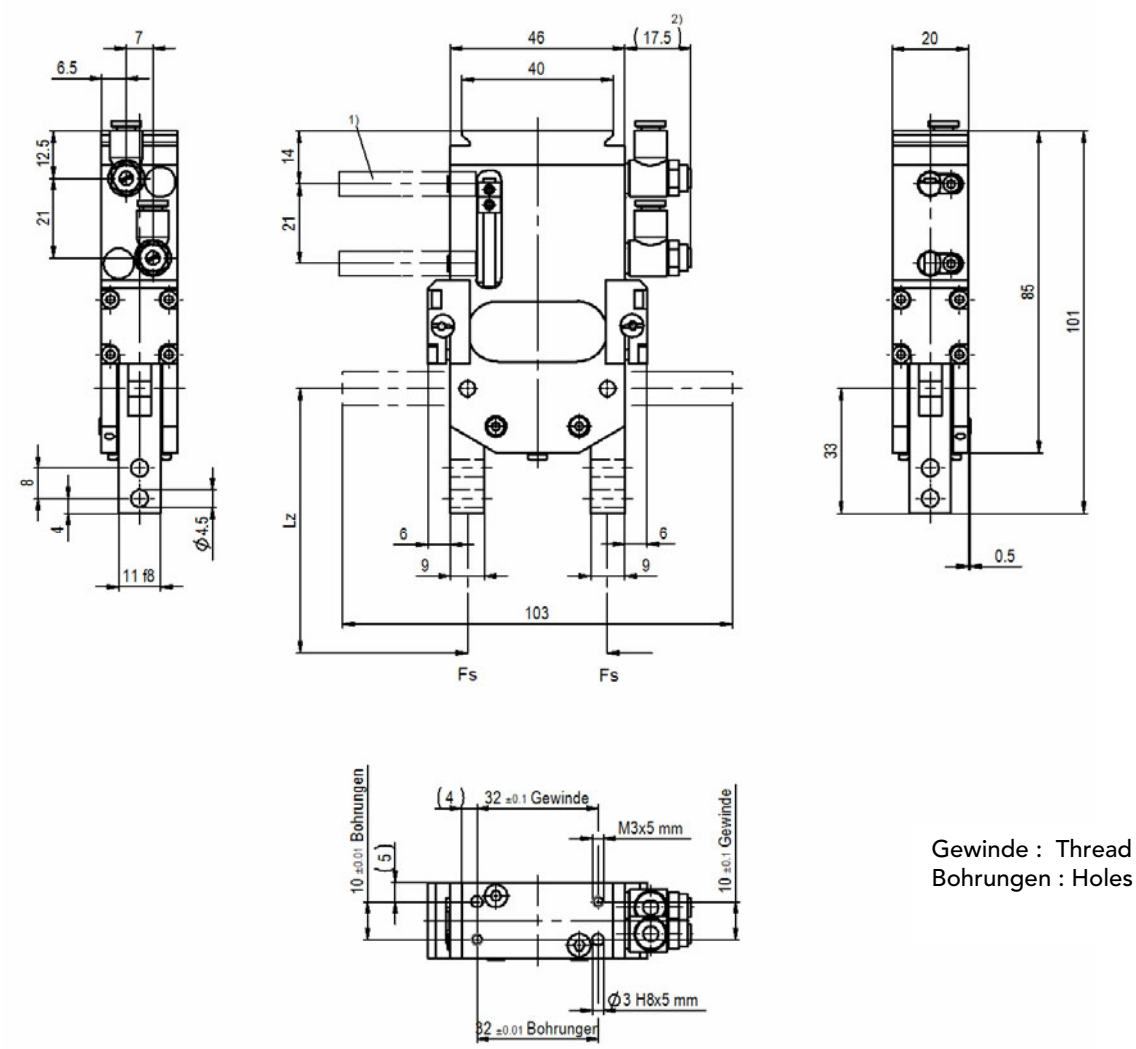


Fig. 1.2-3: Diagram: Opening and closing times



1.3 Dimension diagram GWU-16

Fig. 1.3-1: Dimension diagram GWU-16

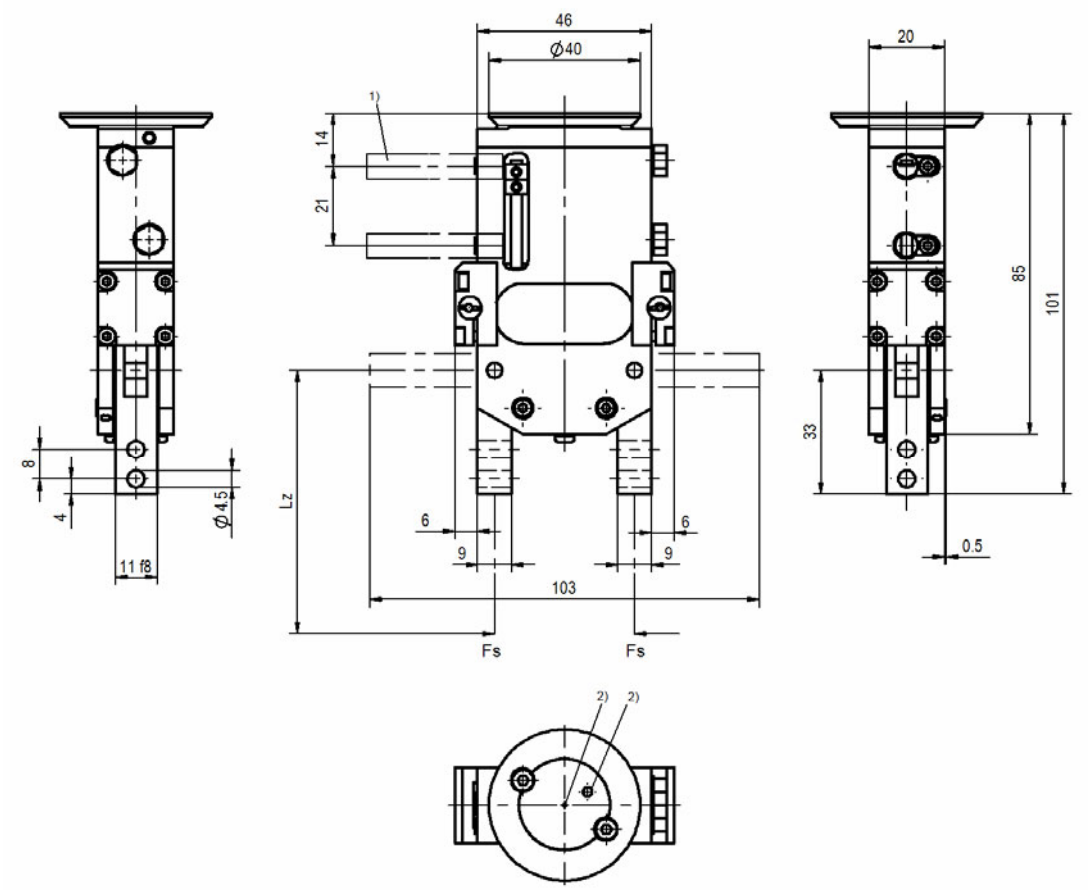


1) Inductive proximity switches Ø 6.5mm, installation depth 6.7mm
2) Air connection

Designation	Ref. no.
GWU-16	56266

1.4 Dimension diagram GWUI-16

Fig. 1.4-1: Dimension diagram GWUI-16



1) Inductive proximity switches Ø 6.5mm, installation depth 6.7mm
2) Air connection

Designation	Ref. no.
GWUI-16	56567

1.5 Technical data for gripper GWU-20 / GWUI-20

			GWU-20 / GWUI-20
Opening angle (infinitely adjustable)		[°]	0-180°
Piston diameter		[mm]	20
Unit weight GWU/GWUI		[kg]	0.43
Moment of inertia Jz (closed)		[kgcm2]	1.34
Max. cycles per minute			max. 80 double strokes / minute
Operating pressure		[bar]	3-6
Operating medium			air filtered to 5µm, oiled or unoiled, dew point <6°C
Repetition accuracy at 5bar	1)	[mm]	±0.05
Check on end positions open/closed	2)		by inductive proximity switches
Pneumatic connection adjustable exhaust throttles with plug connection			hose-∅ 4 mm
Ambient: temperature		[°C]	10-50
rel. humidity			< 95% (non condensing)
purity of the air			normal workshop atmosphere
Warranty			2 years, commencing at the date of delivery
Maintenance			after 10 million cycles
Mounting position			as required
Materials			aluminium, steel, bronze

1) At Lz=38[mm] -> jaw end
Difference between gripped end positions of 100 successive strokes under unchanged conditions

2) See special accessories chapter 1.8

Diagrams GWU-20 / GWUI-20

Fig. 1.5-1: Diagram: Weight of the individual finger

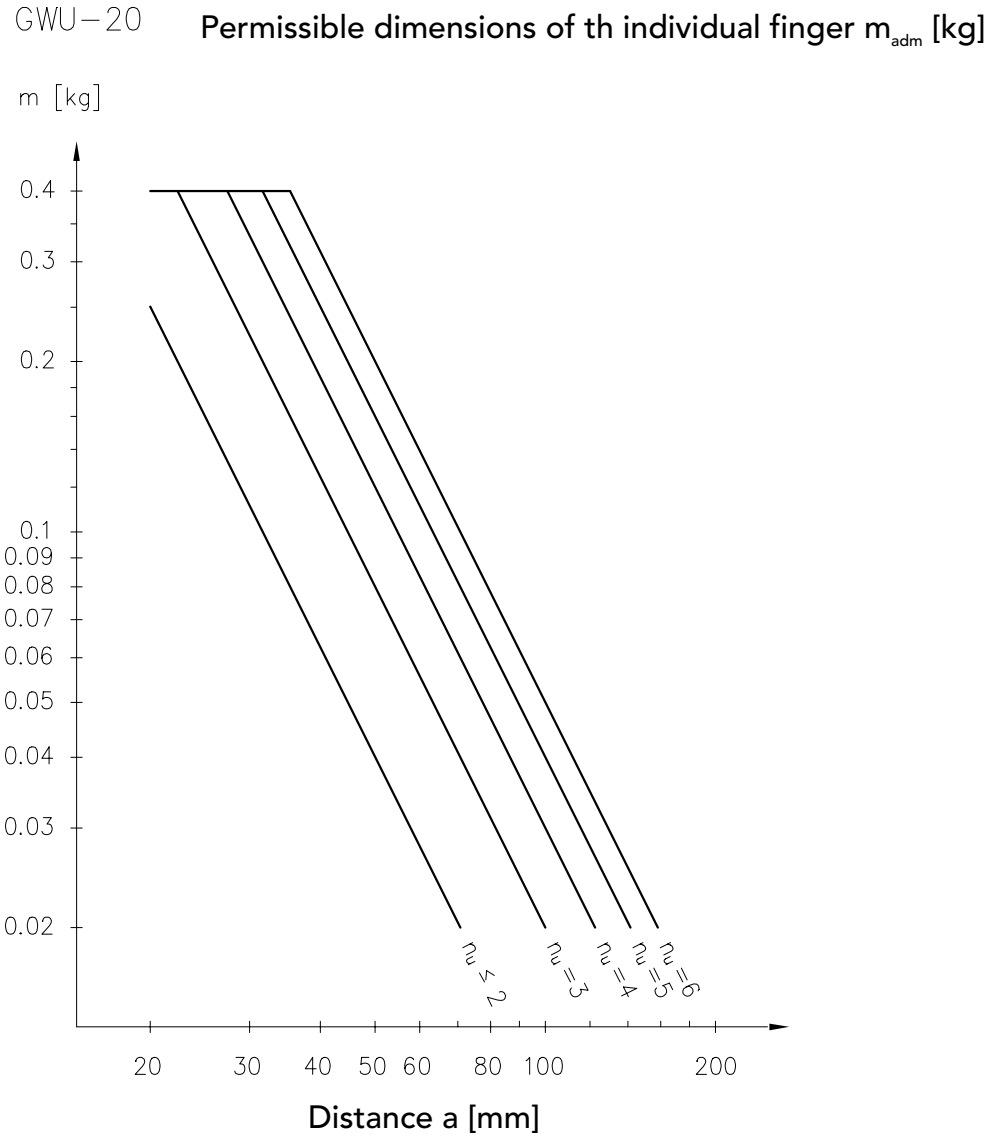


Fig. 1.5-2: Gripping force diagram

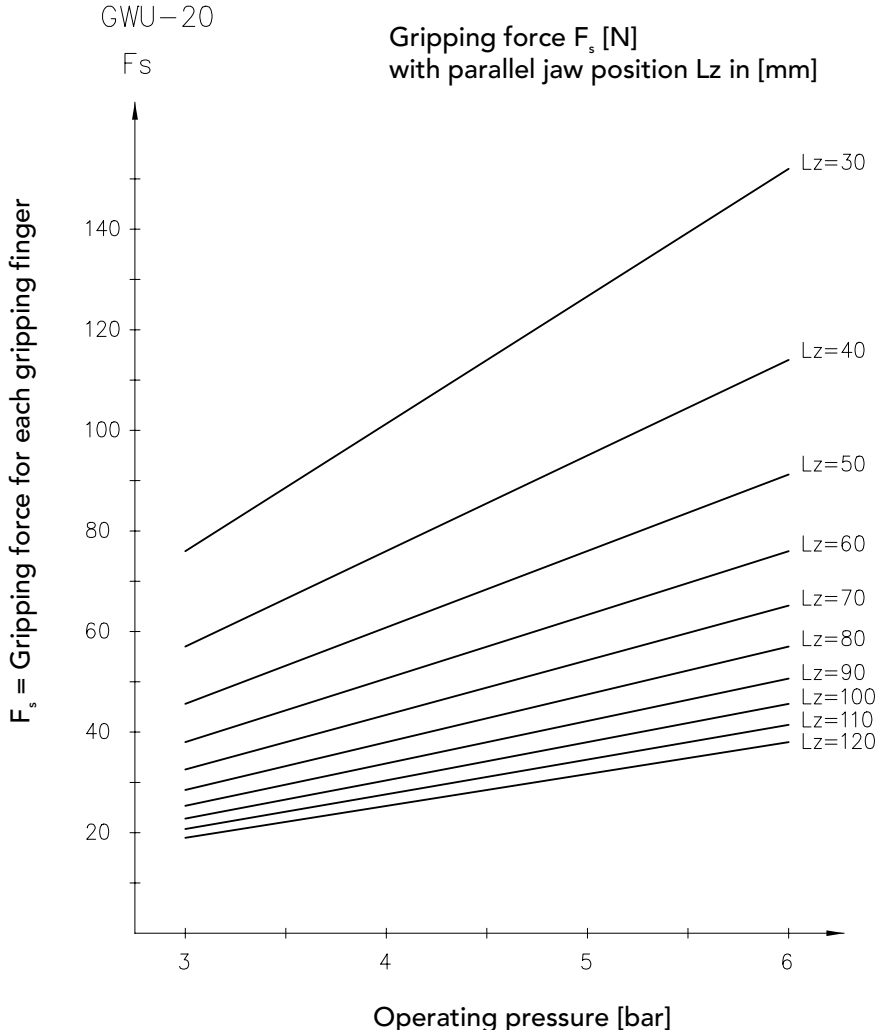
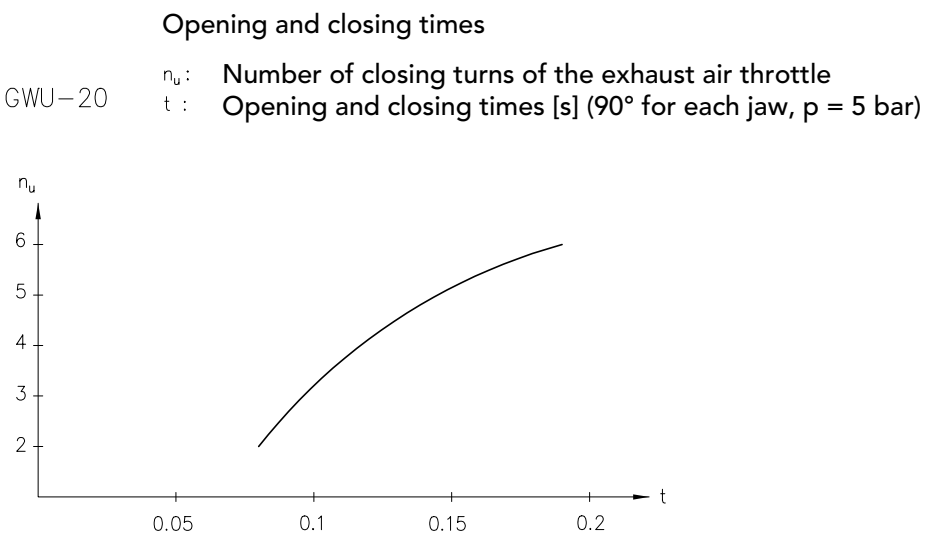
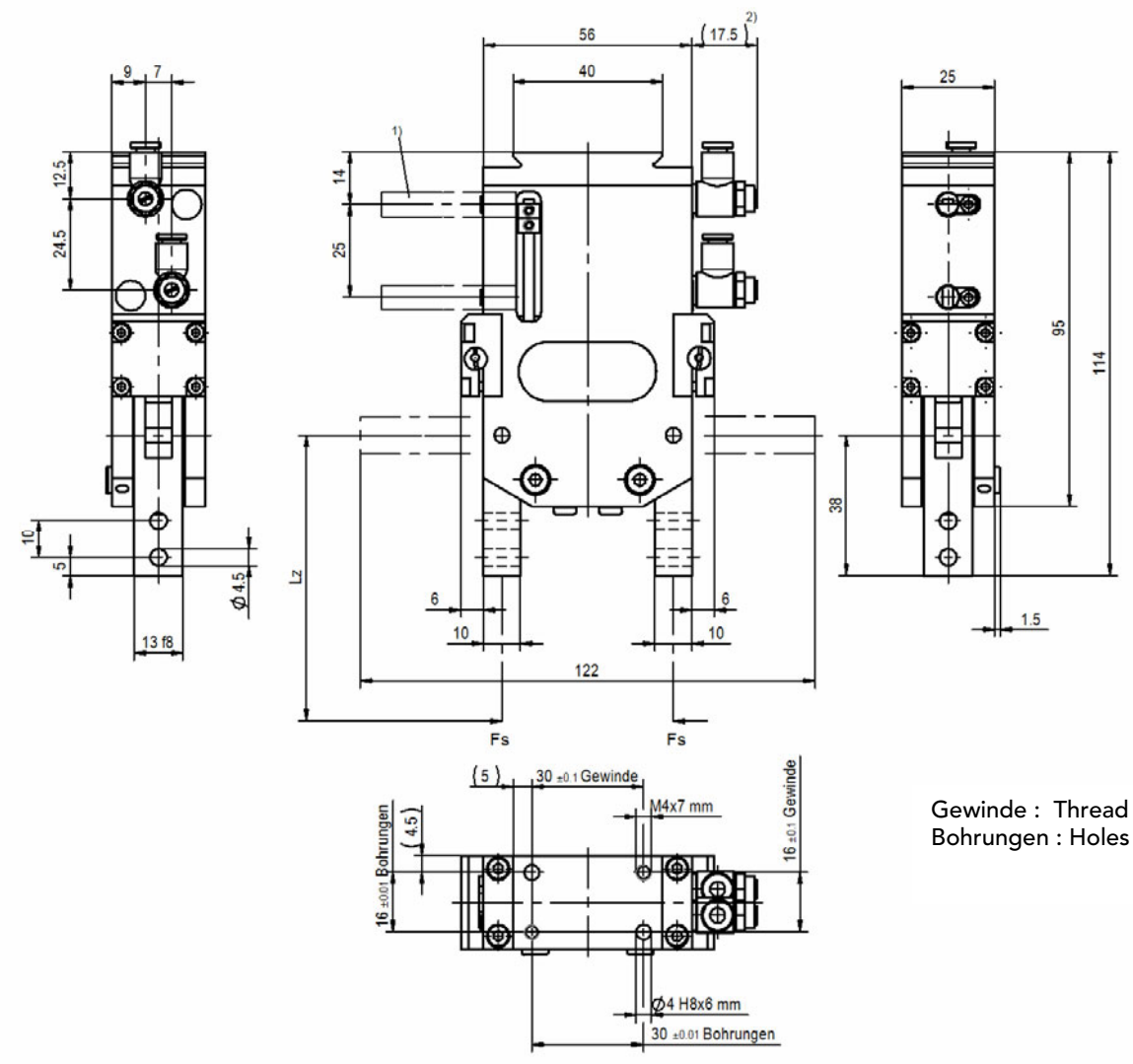


Fig. 1.5-3: Diagram: Opening and closing times



1.6 Dimension diagram GWU-20

Fig. 1.6-1: Dimension diagram GWU-20

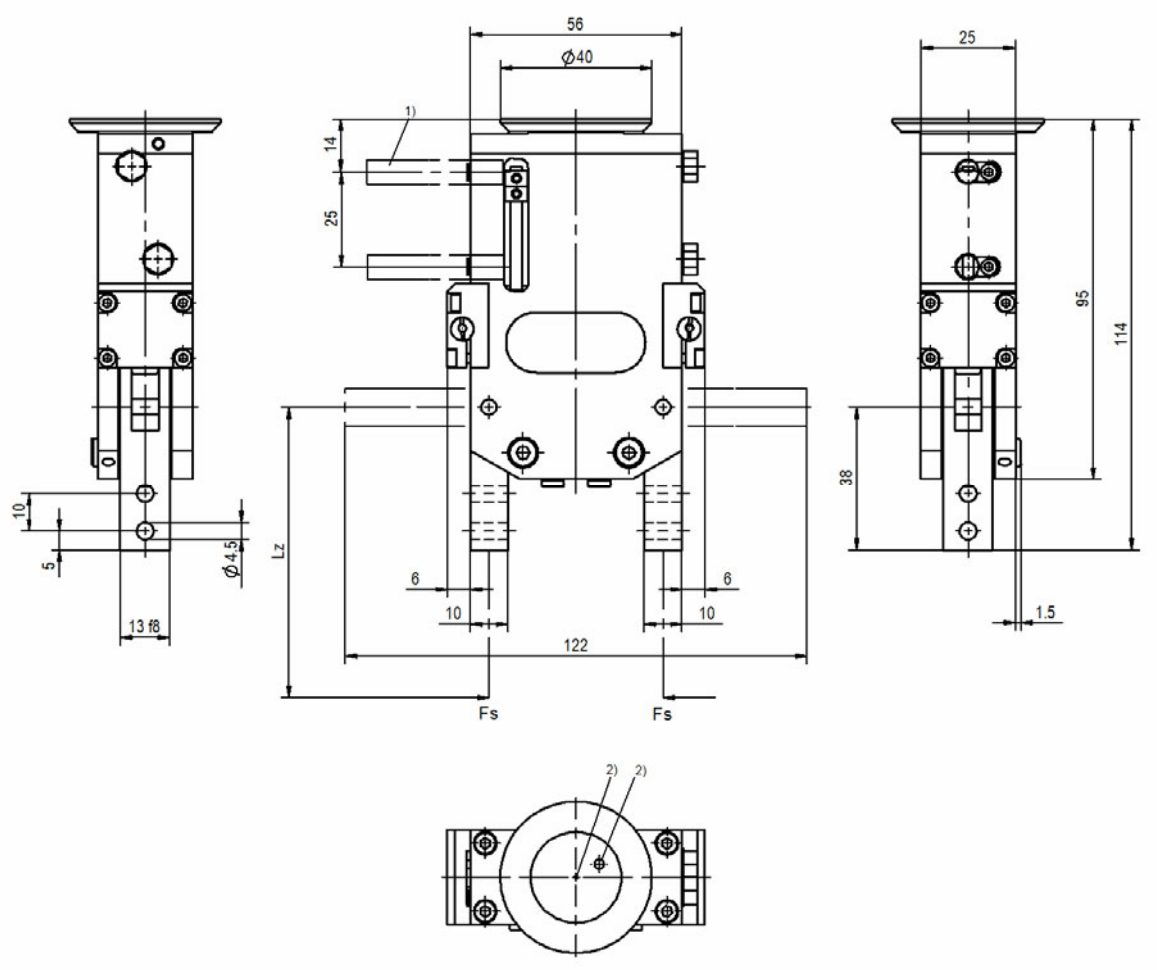


1) Inductive proximity switches Ø 6.5mm, installation depth 8.7mm
2) Air connection

Designation	Ref. no.
GWU-20	56270

1.7 Dimension diagram GWUI-20

Fig. 1.7-1: Dimension diagram GWUI-20



1) Inductive proximity switches Ø 6.5mm, installation depth 8.7mm
2) Air connection

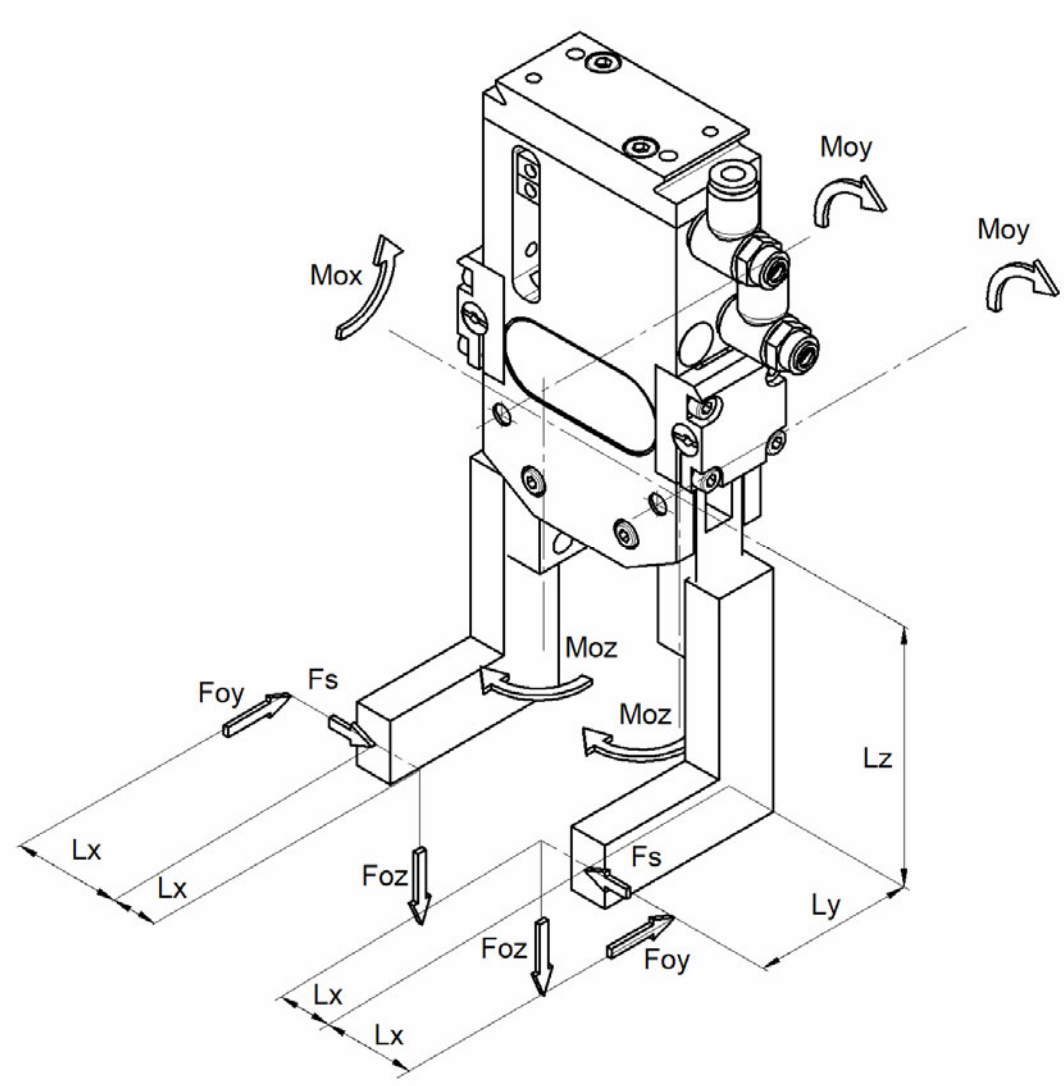
Designation	Ref. no.
GWUI-20	56596

Special accessories:

- Inductive proximity switches PNP Ø 6.5 mm with LED, protected against short circuits and reverse polarity, switching distance 2 mm, cable length 5 m ref. no. 504755 / with plug ref. no. 508449.

1.8 Definition of loads

Fig. 1.8-1: Definition of loads



GWU / GWUI		-16	-20
F_s	[N]	see gripping force diagrams	
F_{oz}	[N]	±250	±400
$M_{ox\ permiss.} = (F_{oy} \bullet L_z) + (F_{oz} \bullet L_y)$	[Nmm]	800	2000
$M_{oy\ permiss.} = (F_{oz} \bullet L_x)$	[Nmm]	4000	6000
$M_{oz\ permiss.} = (F_s \bullet L_y) + (F_{oy} \bullet L_x)$	[Nmm]	1000	3000

F_s : Gripping force for each gripping finger [N]
F_{oz} , F_{oy} : Static forces [N]
L_x , L_y , L_z : Distance of force action [mm]
M_{ox} , M_{oy} , M_{oz} : Static loads [Nmm]

When M_{ox}, M_{oy}, and M_{oz} act simultaneously, each may attain its permissible maximum.

NB: If the action of F_{oz} on the gripper jaw is displaced by L_x, the closing force F_s is affected as follows:

$$F_{s\,eff} = F_s \pm F_{oz} \frac{Lx}{Lz}$$

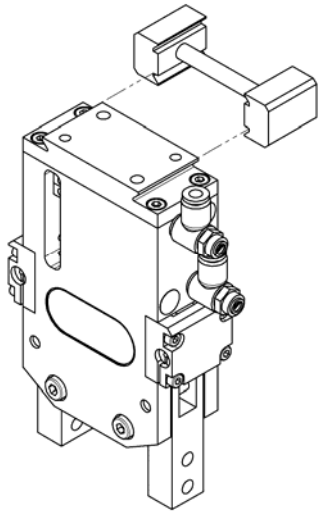
2 Commissioning

2.1 Installation

Laterally displaceable: gripper types GWU-10 and GWU-20

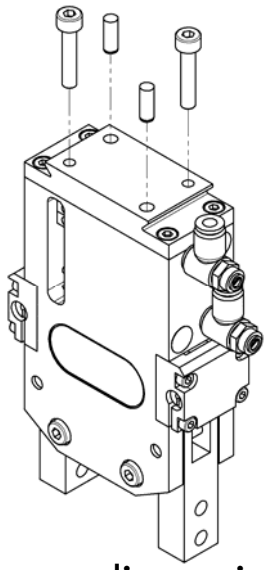
Fig. 2.1-1: GWU laterally displaceable

SLL-20 for
GWU-16 and GWU-20



Screwed and pinned: gripper types GWU-10 to GWU-25

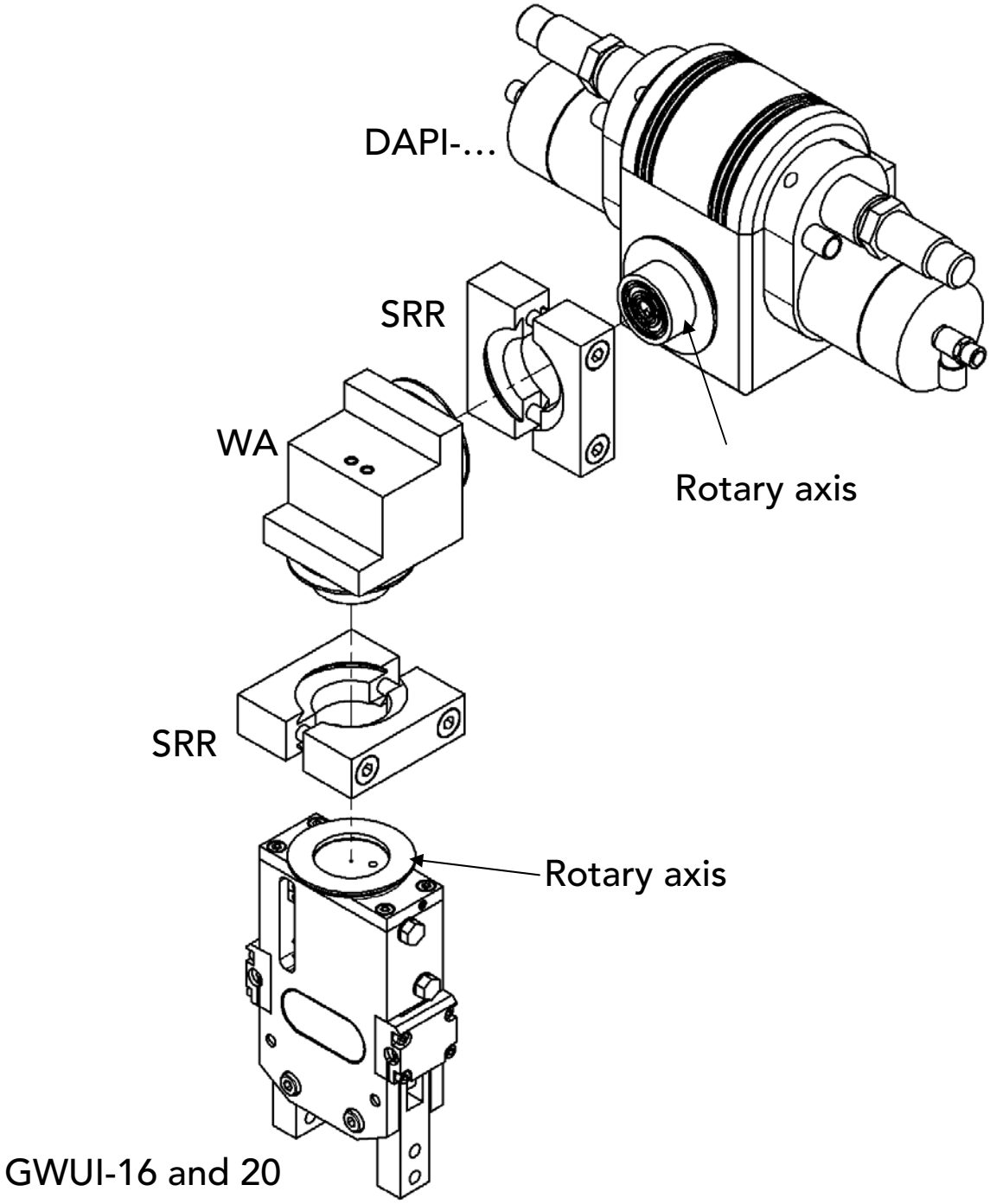
Fig. 2.1-2: GWU screwed and pinned



For information on dimensions see dimension diagrams.

Mounting on rotary unit DAPI
Gripper types: GWUI-16 and GWUI-20

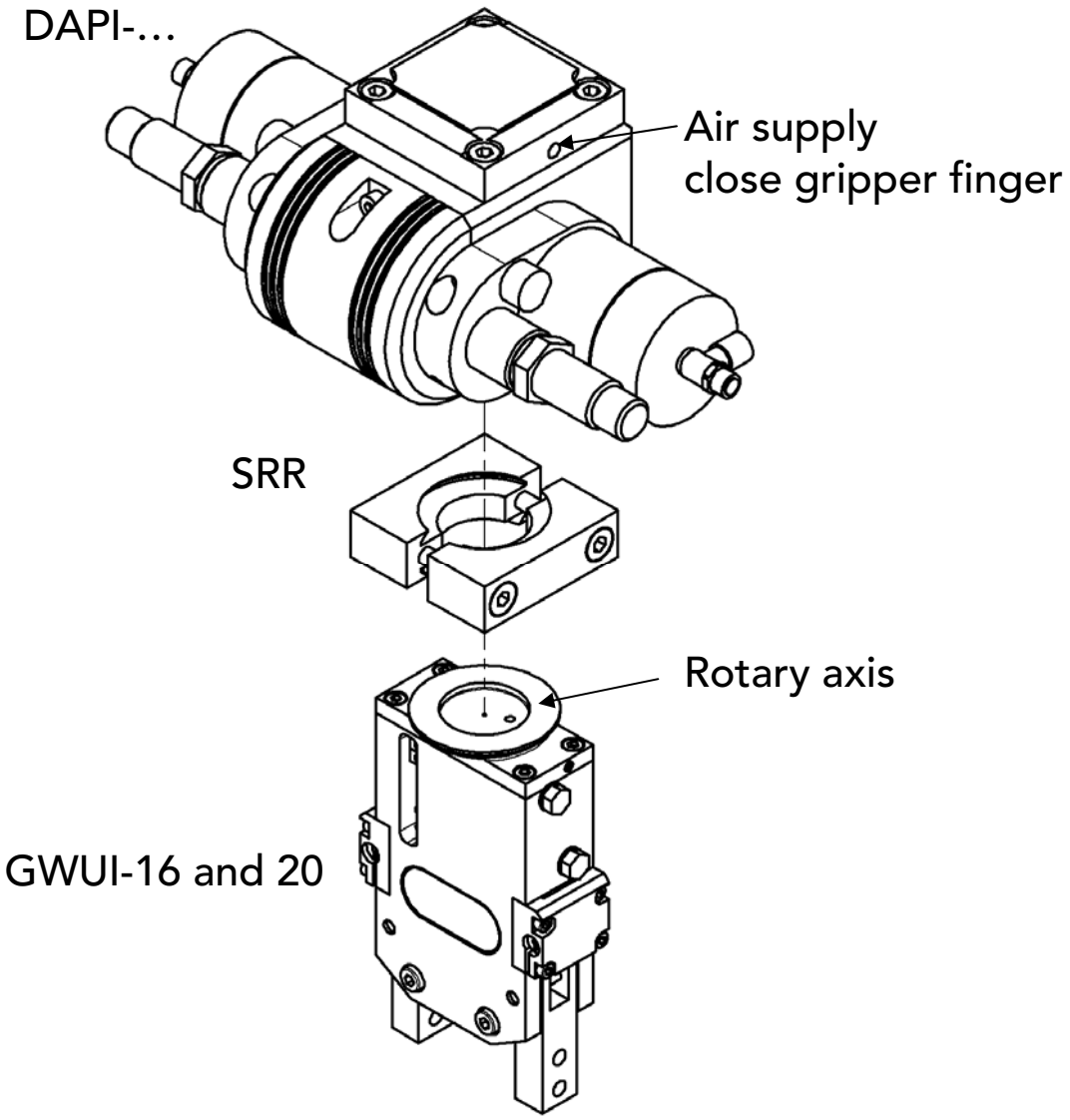
Fig. 2.1-3: GWUI mounting on rotary unit DAPI with WA



GWUI-16 and 20

The position of the gripper on the rotary axis may be freely selected.

Fig. 2.1-4: GWUI mounting on rotary unit DAPI



Air supply to the gripper on the casing of the rotary drive.
The position of the gripper on the rotary axis may be freely selected.

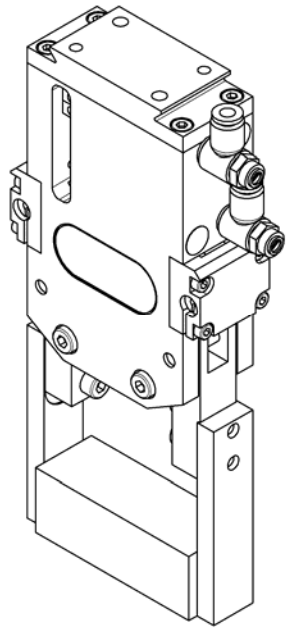
2.2 Mounting position

The GWU / GWUI grippers may be mounted in any position, as required.

2.3 Operating modes

The angular grippers GWU / GWUI are only suitable for external gripping.

Fig. 2.3-1: External gripping



2.4 Air supply

Fig. 2.4-1: Air supply GWU

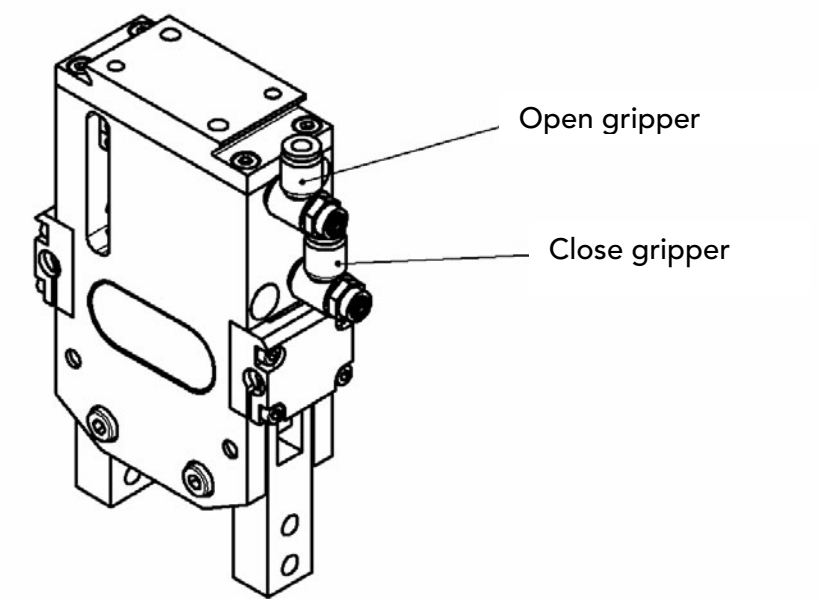
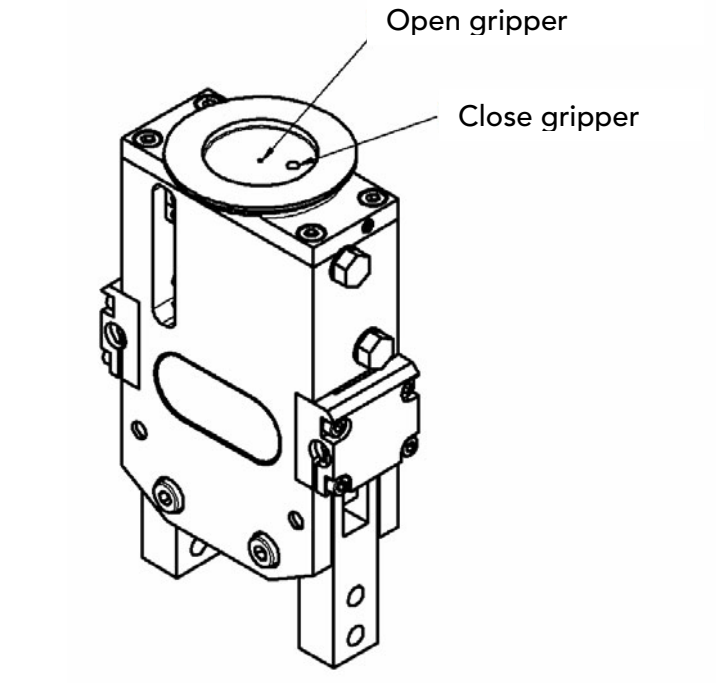


Fig. 2.4-2: Internal air supply GWUI



2.5 Setting the stroke limit when opening

Angular grippers are designed to grip externally only. The closed position of the gripper fingers cannot be adjusted.

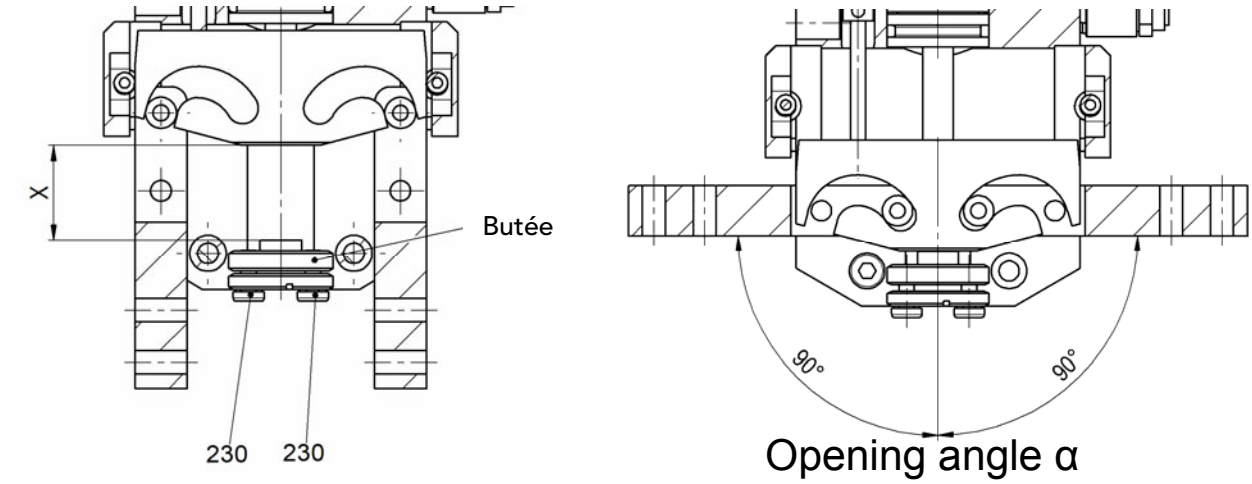
The external position of the jaws can be varied by means of the stop Fig. 2.5-1. The opening angle is adjustable by altering the distance "x".

- Undo the screws 230.
- Using a screwdriver, screw the stop in or out.
  -Increasing "x" increases the opening angle α.
  -Decreasing "x" decreases the opening angle α.
- Secure the stop by tightening the screw 230.

If the stroke is increased (by turning the stop out) Fig. 2.7-2, always release the lower switching block (80b) first, push it up against the upper block (80a) and tighten lightly.

- Adjust the proximity switch as instructed in the section "Connecting and adjusting the inductive proximity switches".

Fig. 2.5-1: Setting the stroke limit when opening

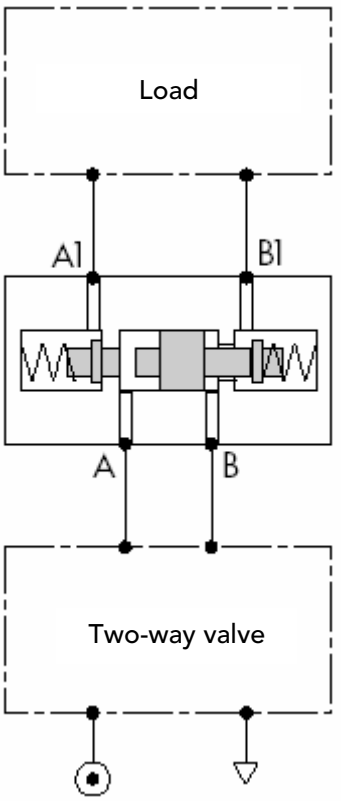


The angular gripper must never be operated without the stop!

2.6 Securing the gripping force

To secure the gripping force, e.g. in the event of an emergency stop, we recommend the use of the stop valve ref. no. 46582. Compared with the use of springs to secure the gripping force, this has the advantage of maintaining the gripping force at 100%.

Fig. 2.6-1: Wiring diagram for securing the gripping force

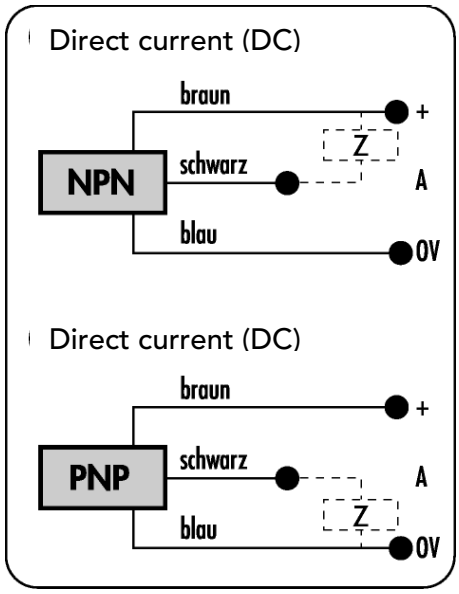


If a single-action load is fitted, the connection B1 must be closed.

2.7 Connecting and adjusting the inductive proximity switches

The proximity switches used must have a switching distance (Sn) of 2 mm, be designed for flush mounting, and have a housing -Ø of 6.5 mm.

Fig. 2.7-1: Connection diagram for inductive proximity switch

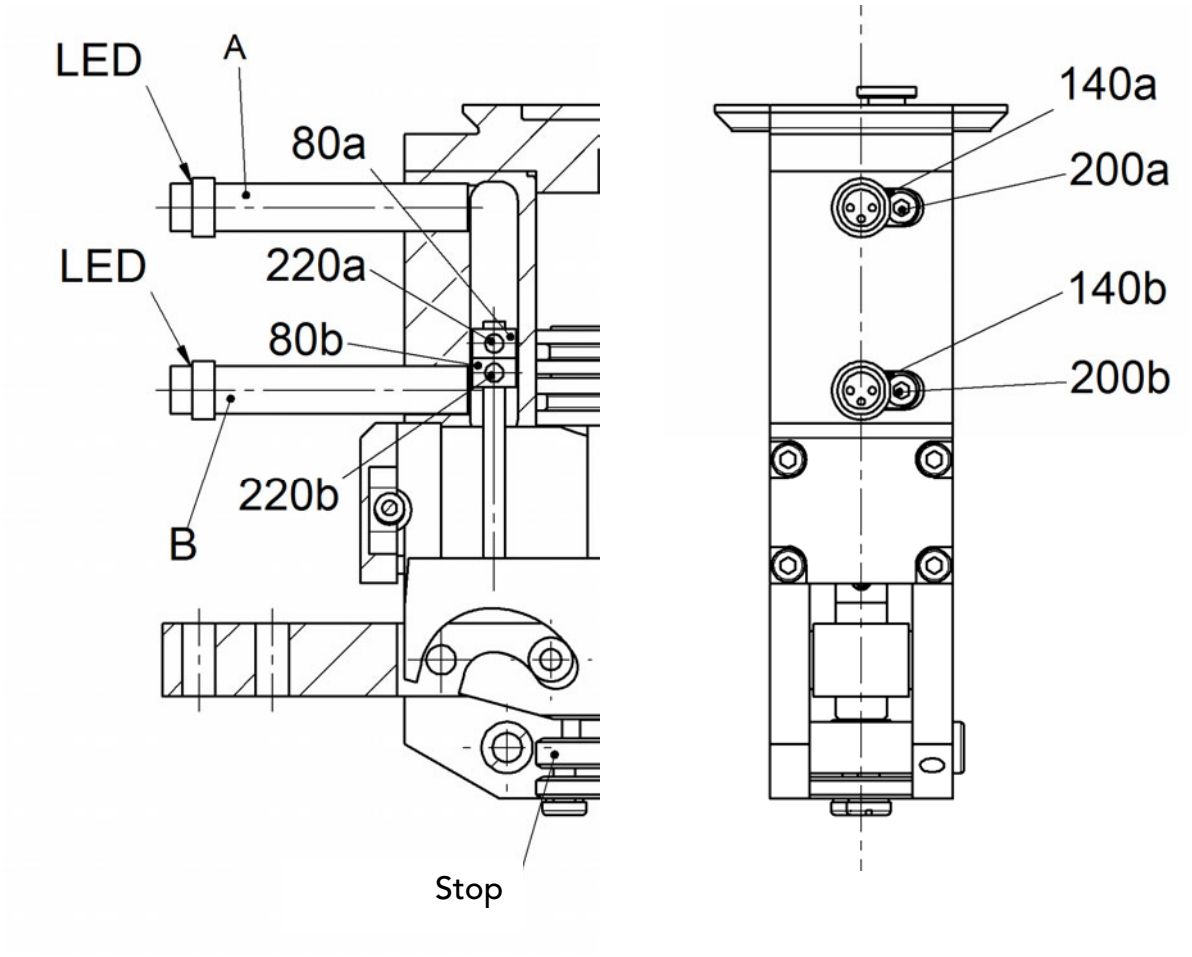


braun : brown
schwarz : black
blau : blue

Closed position see Fig. 2.7-2

- Push the proximity switch (A) past the clamping block (140a) against the stop in the hole in the casing and tighten it with screw (200a).
- Close the gripper.
- Release the set-screw (220a) on the upper switching block (80a) and displace the switching block until the LED on the electrically connected proximity switch lights up.
- Secure the switching block (80a) by tightening the set-screw (220a).

Fig. 2.7-2: End position scanning by inductive proximity switch

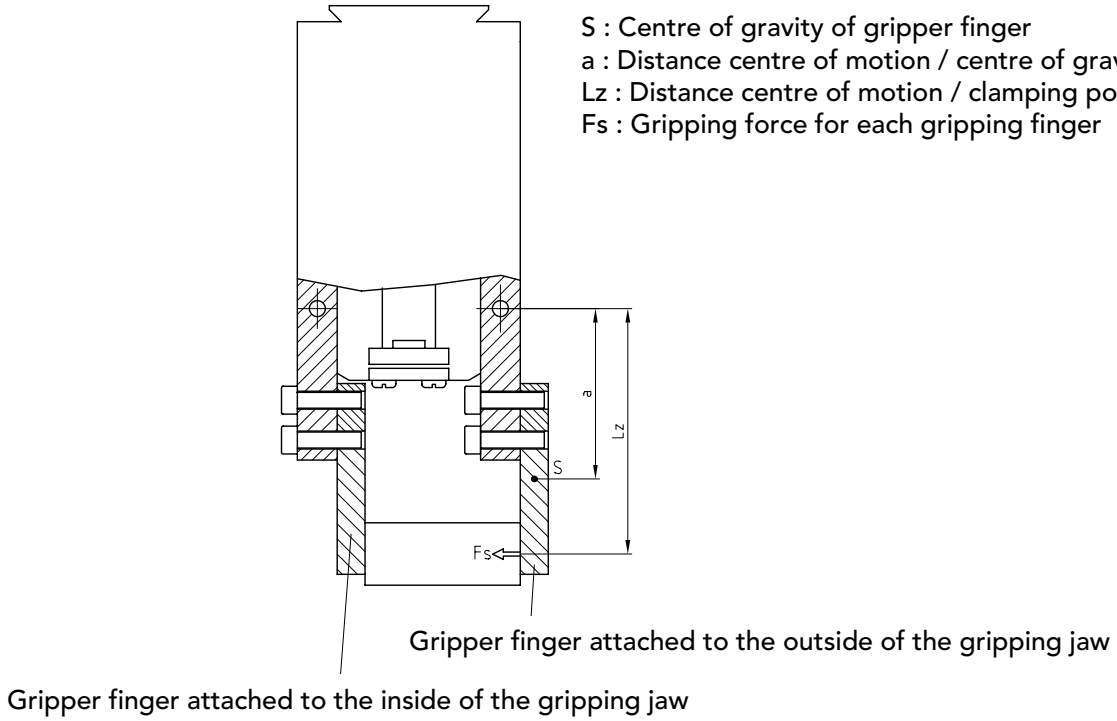


Open position **see Fig. 2.7-2**

- Push the proximity switch (B) past the clamping block (140b) against the stop in the hole in the casing and tighten it with screw (200b).
- Open the gripper (move against the stop).
- Release the set-screw (220b) on the upper switching block (80b) and displace the switching block until the LED on the electrically connected proximity switch lights up.
- Secure the switching block (80b) by tightening the set-screw (220b).

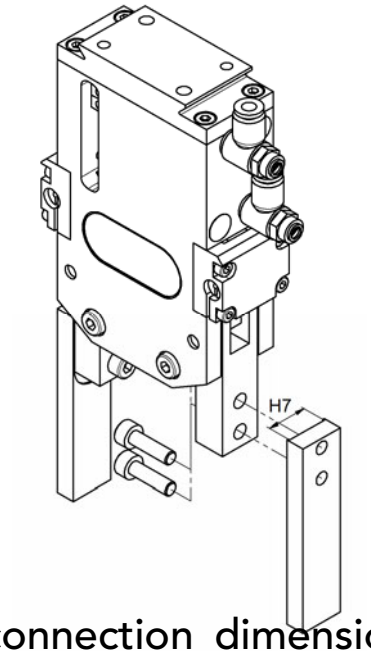
2.8 Mounting the gripper fingers on GWU grippers

Fig. 2.8-1: Mounting the gripper fingers


S : Centre of gravity of gripper finger
a : Distance centre of motion / centre of gravity
Lz : Distance centre of motion / clamping point
Fs : Gripping force for each gripping finger
a
Lz
S
Fs
Gripper finger attached to the outside of the gripping jaw
Gripper finger attached to the inside of the gripping jaw

See also the section Definition of loads

Fig. 2.8-2: Connection dimensions of the gripper fingers



For information on connection dimensions of gripper fingers see dimension diagrams.

2.9 Speed regulation

The speed is regulated by two M5 exhaust throttle valves.

For adjustment of the exhaust throttle valves see the section Opening and closing times.

Failure to comply with this instruction can result in the destruction of the unit!

2.10 Maintenance

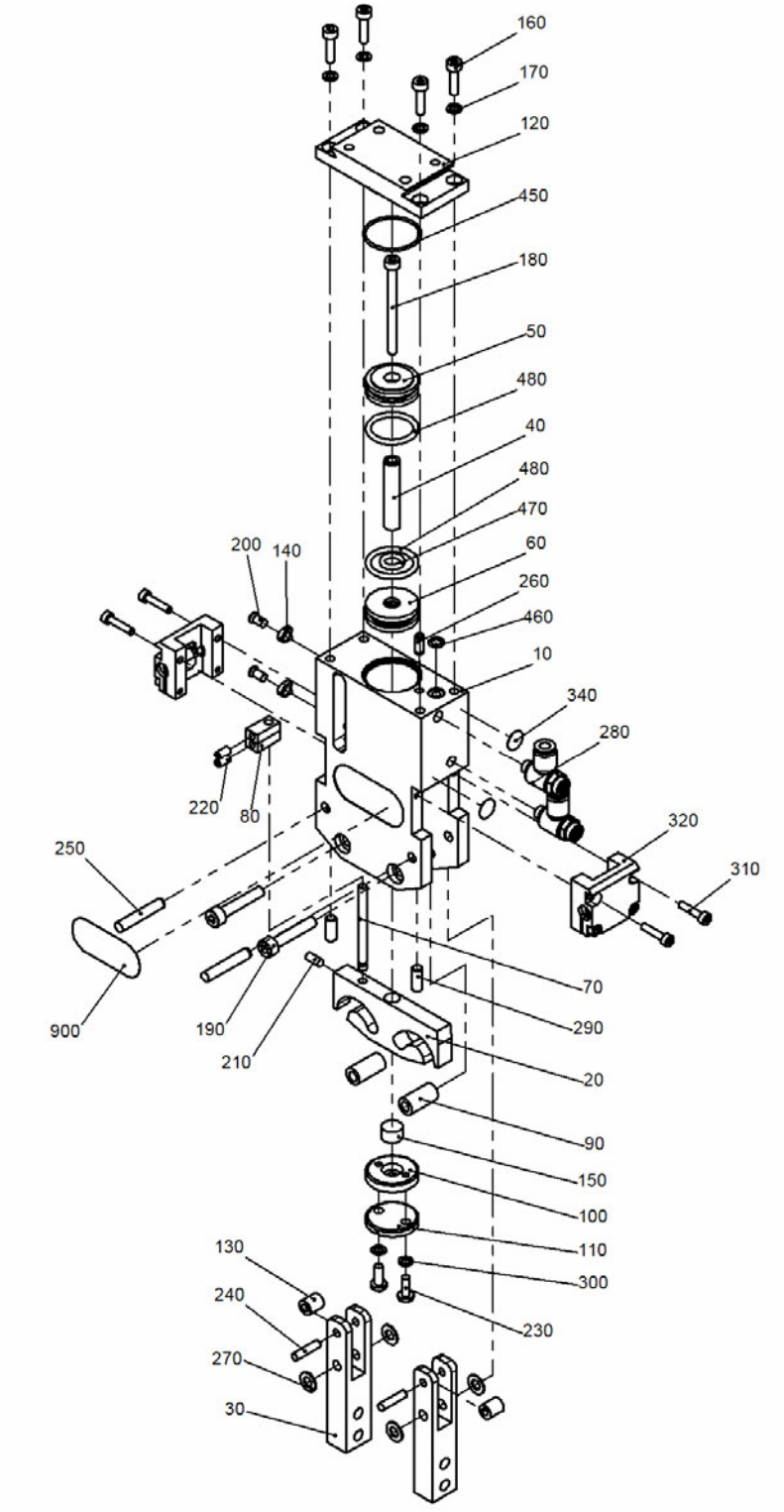
The gripper requires no maintenance to 10 million cycles. Thereafter, we recommend the following maintenance work:

- Cleaning the device, in particular the guide mechanism.
- Lubricating, in particular the guide mechanism, with lubricant Paraliq P 460 reference no. 504721.

3 Exploded views / parts lists

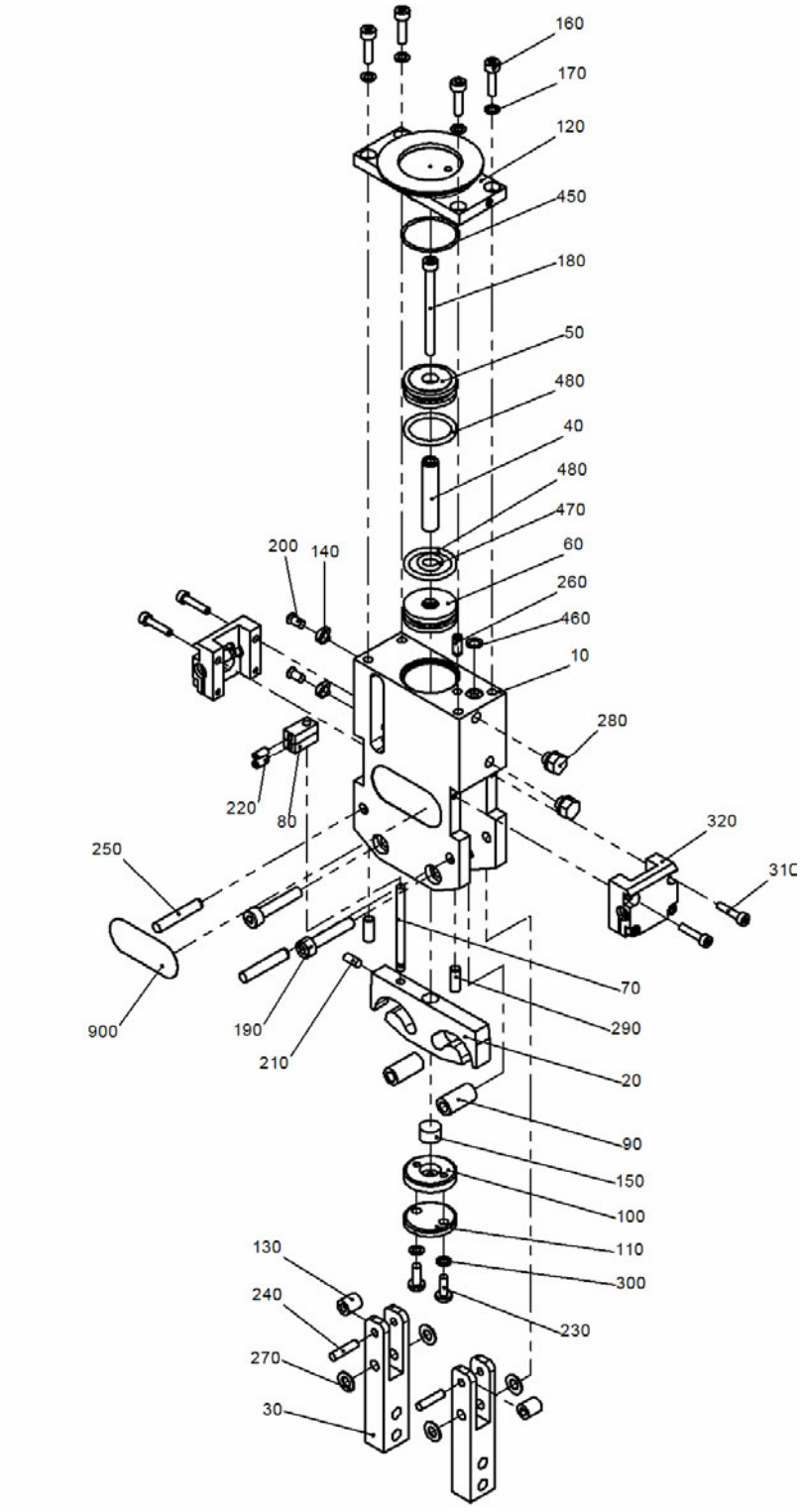
3.1 Exploded view GWU

Fig. 3.1-1: Exploded view GWU



3.2 Exploded view GWUI

Fig. 3.2-1: Exploded view GWUI



3.3 Parts list / wearing parts GWU / GWUI

No.	Part	Ref. no.		Material
	GWU / GWUI	**-16**	**-20**	
10	Casing	56256	56272	Aluminium
20	Bracket	56257	56274	Steel
30*	Gripper jaw	56258	56273	Steel
40	Piston rod	56490	56491	Steel
50	Piston	56492	56493	Bronze
60	Cylinder cover	56494	56495	Bronze
70	Rod	56261	56271	Steel
80	Switching block)	56262	56262	Steel
90	Spacing sleeve	56265	56278	Steel
100	Stop	56423	56425	Steel
110	Adjusting disc	56424	56426	Steel
120	Cover GWU	56255	56276	Aluminium
120	Cover GWUI	56566	56573	Aluminium
130*	Guide roller	46523	46078	Steel
140*	Clamping block	47906	47906	Steel
150	Buffer	46638	46638	PUR
160	Chhd screw M3x12	502504	502504	Steel
170	Ribbed washer M3	505385	505385	Steel
180	Chhd screw M3x35	520060	-	Steel
180	Chhd screw M3x40	-	520066	Steel
190	Chhd screw M2.5x18	520052	-	Steel
190	Chhd screw M4x22	-	506183	Steel
200*	Clamping screw	47904	47904	Steel
210	Cylindrical pin M3x8	508866	508866	Steel
220	Cylindrical pin M3x6	508865	508865	Steel
230	Flat-head screw	505558	-	Steel
230	Flat-head screw M3x8	-	505404	Steel
240*	Cylindrical pin spec.	56498	-	Steel
240*	Cylindrical pin spec.	-	56499	Steel
250*	Cylindrical pin	502038	-	Steel
250*	Cylindrical pin	-	502041	Steel
260	Spiral locking pin Ø3x8	504833	504833	Steel
270*	Lock washer Ø4x0.5	505228	505228	Steel

* Marked articles are wearing parts; they are available from stock.

No.	Part	Ref. no.		Material
	GWU / GWUI	**-16**	**-20**	
280	Exhaust throttle screw	505023	505023	Steel
280	Blind plug M5 GWUI	502289	502289	Steel
290	Set-screw M3x10	508868	-	Steel
290	Set-screw M4x10	-	520068	Steel
300	Ribbed washer M2.5	508867	-	Steel
300	Ribbed washer M3	-	505385	Steel
310	Chhd screw M2.5x12	506736	506736	Steel
320	Roll holder assembly	56500	56501	
320/400	Roll holder	56259	56277	Aluminium
320/410	Guide roller	56497	56497	Steel
320/420	Cylindrical pin	520050	-	Steel
320/420	Cylindrical pin	-	502013	Steel
320/430	Cam sleeve	56260	56260	Steel
320/440	Chhd screw M2.5x8	507311	507311	Steel
330*	Seal kit	510011	510012	
330/450	O-ring 16x1	505557	-	NBR
330/450	O-ring 20x1	-	503549	NBR
330/460	O-ring 4x1	503101	503101	NBR
330/470	O-ring 5.7x1.9	505555	505555	NBR
330/480	O-ring 13x1.5	501233	-	NBR
330/480	O-ring 16x2	-	520051	NBR
340	Pictograph GWU	47373	47373	Polyester
900	Nameplate CE	41620	41620	Polyester

* Marked articles are wearing parts; they are available from stock.

4 Environmental compatibility

Materials used

- Aluminium
- Steel
- Bronze
- Acrylonitrile-butadiene rubber (NBR)
- Polyurethane (PUR)
- Paraffinic mineral oil, synthetic hydrocarbon oil

Surface treatment

- Anodising of aluminium

Shaping processes

- Machining of aluminium, steel, bronze and PUR
- Moulding of NBR gaskets
- Extruding of PUR

Emissions in service

- None

When units are used with oily air, we recommend that the exhaust air be returned to atmosphere through an oil separator or filter.

Disposal

Grippers that are no longer serviceable should not be disposed of as complete units, but dismantled into their parts which can be recycled according to the types of material of which they are made. The type of material used for every part is shown in the spare parts list. Material that cannot be recycled should be disposed of appropriately.

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